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ABSTRACT

The Ad Hoc Council on Educational Reform pointed out in 1987 that Japanese education must prepare for the ever-increasing information needs of the future, and in 1988, a proposal for the development of information networks was published by the Ministry of Education, Science, and Culture. This proposal recommended the utilization of a wide range of media in support of lifelong learning activities and the establishment of such systems in various localities. Three models for information dissemination using personal computer communications (at the school, regional, and national levels) are described in the first section of this document. The remaining four sections describe currently-existing information networks throughout the country, including: (1) the Audiovisual Public Board (AV-PUB) System, a telecommunications system comprised of a database on audiovisual materials and a bulletin board for exchanging information related to audiovisual education; (2) commercial computer networks throughout Japan (used primarily by teachers, boards of education, and researchers); (3) computer networks established by local boards of education and similar organizations; and (4) the Academic Information Center System, which provides online databases and an electronic mail service for universities and research institutions throughout Japan. Fifteen figures are included in this document. (GL)

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COMPUTER NETWORKING
IN
JAPANESE EDUCATION TODAY

Japan Audiovisual Information Center
for International Service
Japan Audiovisual Education Association

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Preface

The rapid development of information media systems and networks throughout Japanese society during the later half of the 1980's has been most remarkable. As part of this phenomena, the development and use of databases in education is also being seen more and more often. The Japan Audiovisual Education Association, a Public Foundation, recently established a nation-wide audiovissual educational materials network, called AV-PUB (Audiovisual Public Board) with full service having been initiated in mid-1988.

This short report summaries the current situation as it relates to the use of computer networks in Japanese education. It also introduces some of the efforts of related institutions and networks.

We wish to express our deepest appreciation to Mr. Hiroo Saga of the National Institute of Multimedia Education for his assistance in preparing this paper.

November 1988

Jiro Arimitsu
Japan Audiovisual Education Association

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I. Introduction

1. Computers and Computer Communications

From the middle of the 1980's, along with the realization that educational utilization of computers in Japan was slowly beginning to increase, it was also becoming more and more apparent that they were being connected to communication networks for use in data exchange and database searches. These trends became part of the background behind the introduction of microcomputers into Japanese education. In January 1983, when the Ministry of Education, Science and Culture conducted its first such nation-wide survey, microcomputer diffusion rates were 0.1% in elementary schools, 1.8% in junior high schools and 45.6% in senior high schools. Acvcording to a survey by NHK (Japan Broadcasting Corporation) made in the fall of 1987, these figures had increased to 13.8%, 38.0% and 92.2%, respectively.

At the same time, within society as a whole, there has been a great deal of progress in linking computers with communication systems. Individual utilization of bulletin board systems (BBS) and participation in computer conferences are becoming ever more popular and specialized, and on-line databases are being rapidly developed. According to a May 1988 survey by the Ministry of Postal Services, today in Japan there are now 13 major, public, nation-wide on-line databases which are being used by upwards of 128,000 people. In addition, there are about 2,000 local networks, to include even small host stations being operated by junior high students from their own homes.

To date, most computer communications efforts in the field of education have existed merely as sub-sections of the nation-wide commercial networks. In fact, many of them have been limited to rather simple volunteer-monitored computer conference systems. Very few examples of

independent educational computer communication networks have been developed to date. In Japan, the first computer network established by a educational organization was AV-PUB (Audiovisual-Public Board). This system is maintained by the Japan Audiovisual Education Association, a public foundation. AV-PUB is an electronic bulletin board system designed to act both as an audiovisual education materials database as well as an electronic mailbox for free and unlimited information exchange among participants.

A number of local educational organizations have also established regional computer networks for use just in their immediate, surrounding areas. Some of these provide on-line, still picture material services to local schools. The Ministry of Education, Science and Culture has now begun furnishing financial assistance for the construction of local-level educational information networks of this type.

In some schools the students themselves, as part of their learning activities, are using computers to communicate with other schools, sometimes even with schools in other countries. In addition to these user-participation networks, there are also a number of networks which provide academically-oriented databases for universities and research institutes. International data circuits make it possible for these to also access networks and databases outside Japan.

2. Information Network Proposals

A number of questionnaires and reports on information networks and education were published by various educational administrative organizations during 1987. The Ad Hoc Council on Educational Reform published its Third Report on Educational Reform in April 1987, and then its Final Report that same August. Among the numerous points emphasized by this Council, it was emphatically pointed out that Japanese

education needs to adapt to the ever-increasing levels of onformation which are going to be required, and will certainly become available for transmission and use in the future. On April 28, 1988, a more concrete proposal for the development of information networks was published by the Subcommittee on Educational Media, Social Education Council, Ministry of Education, Science and Culture in a report on "Lifetime Learning and the New Media."

a. Educational Computer Networks

The last-mentioned report stated out that a wide range of media should be used in support of lifetime learning activities and recommended the establishment of such systems in various localities. The primary objective of this report was to develop a number of concrete models for appropriate educational use of the new media, models which demonstrate ways in which informational networks can be used in eduation. Three of the more representative of the nine models outlined in this report are presented below.

Figure 1 outlines a "Regional Educational Opportunities Information System." Designed for use at the local or regional level and primarily directed towards adults outside the formal school system, this model provides secondary information on available educational opportunities not only to social education facilities but also to individual learners and study groups. In addition, it has the potential to provide for a mutual flow of information among all of these groups. The use of personal computer communications makes all of this possible.

Figure 1.
Regional Educational Opportunities Information System

Scope: Local/Regional Level
Area: Social Education
Purpose: Supplementary Information on Learning Opportunities

Information Provided

(General Information) System Utilization Guide Board of Education News Local Administrative News etc.	(Temporary Information) Public Hall Information Class/Lecture Bulletins New Library Books New AV Materials Club/Circle Information Exhibition/Event Guides etc.
(Individual/Institutional Information Exchange) Meetings and Gatherings Information Exchange Administration Liaison etc.	(Semi-Permanent and Permanent Information) Facility Guides Local/Regional Information Library Information AV Center Information Lists of Study Groups etc.

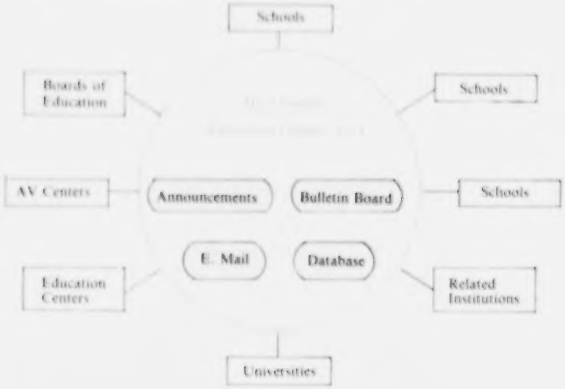
Figure 2, is a model for a "Regional School Information System." Designed for use by both schools and teachers, it provides data on different schools and related organizations, information on a variety of instructional materials, reports on teaching practices divided by subject matter, statistical data related to education, etc., as well as a broad range of other data information which can be beneficial to school education. This model is also designed in such a way as to provide unlimited mutual excange of information between participants to achieve these goals, the host computers are to be located in education or audiovisual centers.

Figure 3 is a model for a Nation-wide Audiovisual Education Materials System which would provide audiovisual centers and libraries with information on various types of audiovisual education material for use in school and social education. Like the others, it also offers means for exchanging information among participants via computer. The AV-PUB system established by the Japan Audiovisual Education Association is based upon this model.

As shown in Figures 1 to 3, the report on "Lifetime Education and the New Media" described a number of models for information networks and emphasized the need to use personal computer communications to bring them to fruition.

Figure 2.
Regional School Information System

Scope: Local/Regional Level
Area: School Education
Purpose: Supplementary Information on School Learning Sources



Information Provided

(General Information) System Utilization Guide Board of Education News Training Session Info. Educational Events and Activities etc.	(Temporary Information) School News (by type/level) Subject Matter Reports (") Academic Society News AV Center Information Education Center Information Exchanges Between Students etc.
(Individual/Institutional Information Exchange) Information Exchange Administration Liaison etc.	(Semi-Permanent and Permanent Information) Subj. Matter Material Lists AV Material Lists Supplementary Reading Lists Educational Statistics etc.

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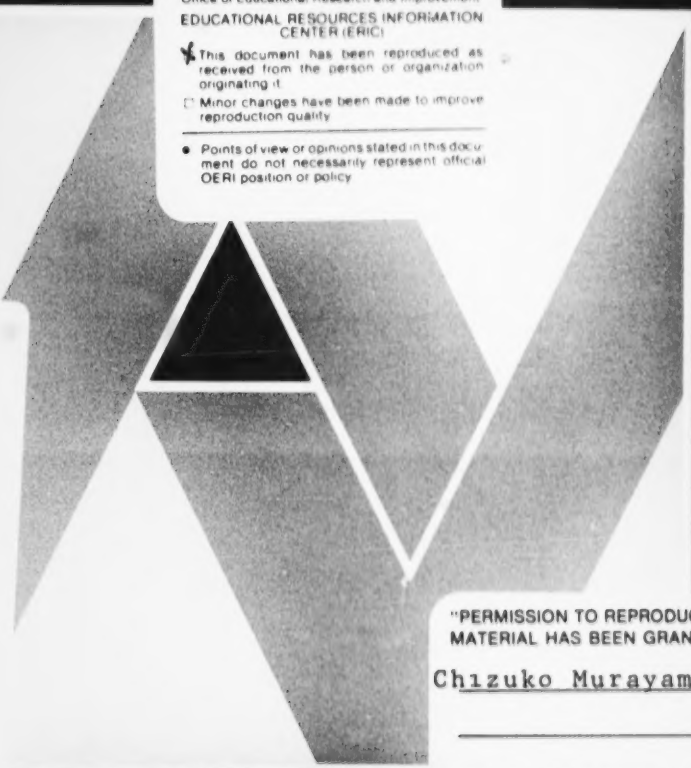

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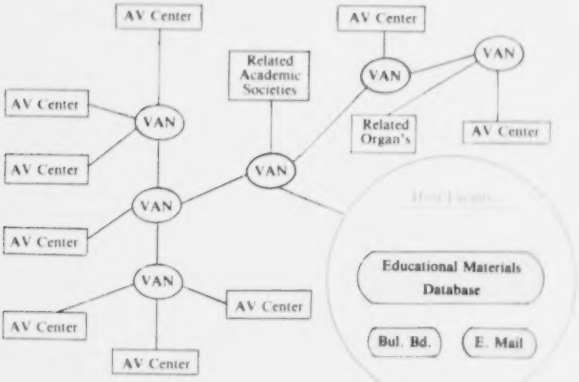
Figure 3.
Nation-wide Audiovisual Education Materials System

Figure 3. Nation-wide Audiovisual Education Materials System

Scope: National Level
Area: School and Social Education
Purpose: Supplementary Information on School Learning Sources



Information Provided

Search by— Grade Level Subject Matter Keyword(s) Year Published Publisher Type of Media etc.	Introduction of New Materials Organization and Class Ass'n News Information on Use of Material Evaluation of Materials Administrative Directives etc.	Information Exchange Administrative Liaison Coordination of Activities and Events etc.

b. "Intelligent" Facilities

Returning again to the reports of the Ad Hoc Council on Educational Reform, the Third Report published in April 1987 called for educational, cultural, and research facilities to be made "intelligent." Note should be taken of the use of the term "intelligent school," a phrase which may be considered to symbolize this report. Its use was not limited to formal schools alone; it was meant to also be closely related to social education. According to this report, making an educational facility "intelligent" means (1) providing conditions which fully incoporate the potentials of the new communication media, (2) establishing an environment both naturally and culturally rich, as well as ensuring that there is always a sense of ample and aesthetical tasteful space, and (3) promoting multiple and multipurpose utilization. In this report, "fully incorporate the potentials of the new communication media" means that these educational facilities are to be mutually interconnected within an all-encompassing information network. Proposals designed to harmonize modern-day technology and humanitarianism, as well as those which aim at the promotion of greater degress of flexibility in the utilization of all types of acilities, will surely come to have a great deal of influence upon the schools and social education facilities of the future.

The August 1987, final report of the Ad Hoc council on Educational Reform, building upon the previous reports, emphasized the need for the educational system of the future, as a whole, to be designed from the viewpoint of lifetime education. It also again pointed out the dire necessity for developing means for coping with coming information age. In the report's own words, "In the future, based upon a thorough appraisal of all that will be beneficial as well as detrimental in the coming age of information, it is necessary to strive towards the building of an information society which manifests a rich humanitarianism and is fully capable of harmoniously combining the natural environment and the traditional culture." The Council also pointed out the need to (1) promote morals

and personal codes of conduct appropriate to the age of information, (2) construct model systems for the coming information society, (3) rationally apply the many and varied modes of information available, and (4) develop information-rich environments.

II. AV-PUB: a Nation-wide Audiovisual Education Materials Data Network

The development of a nation-wide audiovisual educational materials data network, designed to commemorate the 60th anniversary of the founding of the Japan Audiovisual Education Association, was possible thanks to assistance received from the Ministry of Education, Science and Culture during 1987. This "Nation-wide Audiovisual Educational Materials Data Network" consists of two parts, an "Audiovisual Materials Database" and an "Audiovisual Education Bulletion Board." The system is designed so that anyone from anywhere in Japan, using only a personal computer and the telephone, will be able to search for required visual materials, locate data on the newest educational materials and equipment, secure information on research activities and conferences, read reports on media utilization, and so on. Unlimited and mutual information exchange between participants is also possible. Called AV-PUB (Audiovisual-Public Board), experimental utilization was started between a number of education and audiovisual centers in February 1988 and regular service was initiated that same July. According to statistics gathered by the host computer, the system was used by nearly 100 individuals and organizations during August 1988 alone.

1. Outline of the AV-PUB System

The host computer, using a UNIX operating system, is a Convergent Corporation (United States) S/222, 32-bit work station. Capable of processing Japanese as well as English, the computer functions as both a database and an electronic bulletin board. The telecommunications sys-

tem can handle transmissions at either 1,200 or 2,400 bits/second and presently supports three circuits but up tyo 10 circuits may be used. User terminals may be any personal computer or word processor with a telecommunications capability, regardless of make or type. The user needs only a modem and a telecommunications software program. Figure 4 is a picture of the host computer.

Figure 4.
AV-PUB Host Computer

Convergent S/222 Minicomputer

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An outline of the overall configuration of AV-PUB is shown in Figure 5. At each level, users may select the item(s) desired from menus displayed on their own terminals. The opening menu, displayed upon initial access, is shown in Figure 6. AV-PUB is designed to be basically a menu-driven system. This was done so that it would be easy even for new-comers to computer communications to use.

Figure 5.
Overall Configuration of AV-PUB

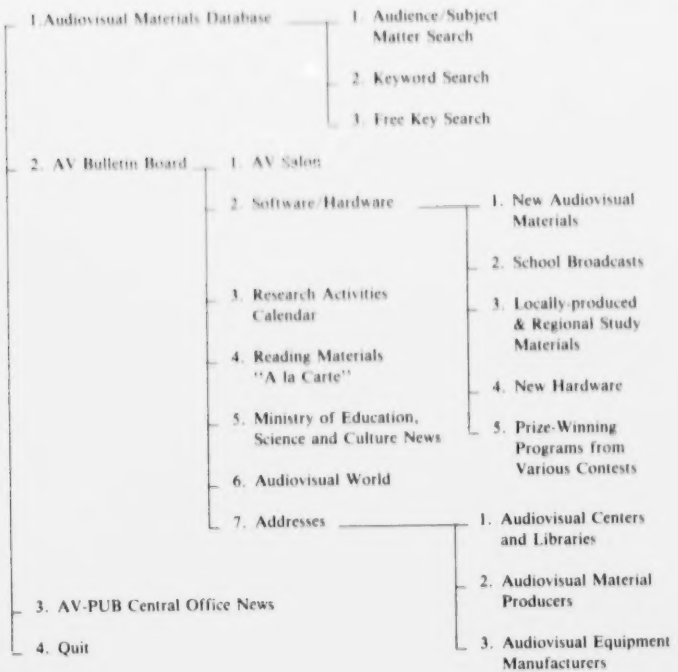
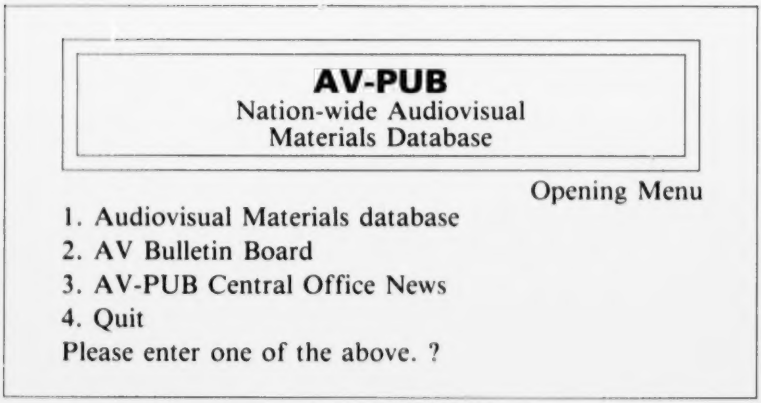

1. Audiovisual Materials Database
1. Audience/Subject Matter Search
2. Keyword Search
3. Free Key Search
2. AV Bulletin Board
1. AV Salon
2. Software/Hardware
1. New Audiovisual Materials
2. School Broadcasts
3. Locally-produced & Regional Study Materials
4. New Hardware
5. Prize-Winning Programs from Various Contests
3. Research Activities Calendar
4. Reading Materials "A la Carte"
5. Ministry of Education, Science and Culture News
6. Audiovisual World
7. Addresses
1. Audiovisual Centers and Libraries
2. Audiovisual Material Producers
3. Audiovisual Equipment Manufacturers
3. AV-PUB Central Office News
4. Quit

Figure 6.
Opening Menu



2. Audiovisual Materials Database

The audiovisual materials database, at present primarily data on 16 mm films available in Japan, includes information on various kinds of audiovisual educational materials. The user may conduct on-line searches from a variety of approaches. As of August 1988, the database contained information on approximately 3,700 16 films and 35mm slide sets, all produced since 1975. In the future, information on videotape materials, videodiscs, computer software, etc., will also be entered into the system. Figures 7 and 8 are the results of an actual search based upon using the categories "16mm film," "Elementary School," and "Social Studies." Figure 7 lists available titles while Figure 8 displays more detailed information from one of them.

Figure 7.
Results of a Search

[Audiovisual Materials Database] Media: 16
Audience: Elementary Subject: Social Studies
Keyword:
Free Key:

1. Life in Warm Okinawa
2. The Life of People in Warm Climates — Okinawa
3. Life in Warm, Rainy Climates
4. Tokugawa Iemitsu and the Edo Bakufu
5. Kamakura As It Was: The Kamakura Gov't & Common Samurai
6. The Life and Work of Rice Farmers
7. City Life in Edo as Seen through the Ukio-e
8. Farmers who Raise Cattle — Husbandry in Kujuu Heights
9. Costal Fishing — Fukueshima, Nagasaki Prefecture
10. Deep Water Fishing — Yaizu
11. Edo Period Cabinetwork
12. City Folk and Farmers — Mid-Edo Period
13. The World of the Nobility — Fujiwara Michinaga

Showing Results of Search Display: 1/76
List of Titles

Figure 8.
Results of a Search (Detailed Data)

[Audiovisual Materials Database] Media: 16
Audience: Elementary Subject: Social Studies
Keyword:
Free Key:

The Life of People in Warm Climates — Okinawa
Media: 16 Year: 1986 Standards: 20 min/color
Producer: Gakushu Kenkyusha Film/Software Tel: 03-726-8751

Contents: How people adapt to living in warm climates.
Also, how climates affect farming and other types of production.
Okinawa is used as an example.

School or Group Type: Elementary NDC:
Subject Matter: Social Studies
Keys: Unique Regions Warm Regions Weather Production
Awards: Recommended by the Ministry of Education
Memo:

Showing Results of Search Display: 2/76
Specific Contents

Searches may be conducted in one of several ways:

a. Media

When using AV-PUB, search speed and efficiency can be increased by selecting a specific media from the menu shown in Figure 9. Or, by pressing the return key, AV-PUB will search through all the media types at one time.

Figure 9.
Media Selection Menu

1.	16	16mm Film
2.	8F	8mm Film
3.	VC	Video Cassette
4.	LD	Video Disc (LD)
5.	VD	Video Disc (VHD)
6.	CF	Concept Film
7.	SL	Slides (35mm)
8.	TP	Overhead Transparency
9.	KM	Paper Theater
10.	CS	Computer Software

b. Audience

The AV-PUB database is also divided and coded by audinece as well as by subject. For school education, the audience categories are kindergarten, elementary, junior high, and senior high school; for social education they are nurseries (or infants), juveniles (or young children), youth (or teen-agers), and adults. Subjecvt matter categories for school education are based upon the school curriculum while those for social education refer to content. All of the codes are displayed and selected from menus and, by entering the codes desired, the user can quickly search for a variety of educational materials appropriate to his or her intended audience and subject.

c. Keyword Search

Quick and simple searches for various educational materials may be made by specifying, from a list displayed on the screen, one to three keywords of up to six Japanese characters in length. During any single search, these may be connected by either "and" or "or."

d. Free Key Search

It is also possible to enter "free keys," i.e., keywords which are not included in the list described above. All items containing the free key(s) are displayed. One to three free keys of up to 10 characters in length and connected by either "and" or "or" may be used at one time. This free key system permits very flexible searches of the entire database.

3. AV Bulleting Board

AV-PUB's electronic bulletin board offers a variety of data as well as permits users to freely exchange all types of information related to audiovisual education. The bulletin board's menu, accessed from the opening menu, is shown in Figure 10. It has seven sections, some of which also have a number of sub-sections. Some sections of the bulletin board will accept user to input while others are "read only."

Figure 10.
Bulletin Board Menu

```
**********************************************************
      Audiovisual Education Bulletin Board
**********************************************************
                                        Bulletin Board Menu
1. AV Salon
2. Software/Hardware
3. Research Activities Calendar
4. Reading Materials "A la Carte"
5. Ministry of Education News
6. Audiovisual World
7. Addresses
8. Main Menu
9. Quit
Please enter one of the above. ?
```

By selecting a specific section, one may review a list of titles on file, read any of the messages contained therein, and, for some sections, enter one's own messages. Figure 11 is a sample list of titles taken from "Audiovisual World;" Figure 12 displays the contents of one of these items.

Figure 11.
Example of Bulletin Board Titles

```
* AV World/Number of Items: 12 Items/2 Pages
No:    Date      Lns   Title
0001  88/02/15  021  New Rules for Recruiting ICEM Ass't Member
0002  88/03/13  123  What Do We Know about Film Learning (1)
0003  88/03/13  134  What Do We Know about Film Learning (2)
0004  88/03/14  064  ICEM: "Survey on the Future Use of Media"
0005  88/03/14  129  Developing and Using Interactive Video (1)
0006  88/03/16  127  Trends in Research in Inst./Educ. Tech (1)
0007  88/03/16  124  Trends in Research in Inst./Educ. Tech (2)
0008  88/03/17  128  Reviewing the Effects of Media Educ. (1)
0009  88/03/17  127  Reviewing the Effects of Media Educ. (2)
0010  88/03/18  137  Report of U.S. Comm. on Educ. Tech. (1)
0011  88/03/18  128  Report of U.S. Comm. on Educ. Tech. (2)
0012  88/04/19  078  Instructional Goals: Sesame Street. 85-86
                        -----1/1----

(M,S,F,«CR»,N,B,Rn,Q,H)
Please enter a command:
```

Figure 12.
Example of a Bulletin Board Item

5 Developing and Using Interactive Video (1)

Date	Time	Lines	Pages	Submitted by
88/03/14	18:16	129	(8)	Saga, Hiroo

Synopsis: Developing and Using Interactive Video (1)
Discovering England, BBC, "Domesday"

"Interactive video," combining videodisks and personal computers, takes advantage of the power of images by providing a wide variety of learner-media interactions. From the beginning, development has been aimed at educational use.

"Domesday," prepared by the English public broadcaster, the BBC, is based upon the word "doomsday, i.e., the "last day of judgment." The "Domesday Book" is a record of the census and survey of English landowners and their property made by the order of William the Conqueror during the 11th Century.

-----1/8-----

(M,S,F,«CR»,N,B,Rn,Q,H)
Please enter a command:

The seven bulletin board sections are as follows:

a. AV Salon (Read/Write)

Users may freely exchange opinions and information on any aspect of audiovisual education: for example, reports on the development and use of audiovisual materials, information on the management of audiovisual libraries, reports on the results of the user of instructional materials, notices from related organizations, academic associations and organizations, and even personal opinions and individual requests.

b. Software/Hardware (Read only)

This information, provided by the Japan Audiovisual Edfucation Association, is divided as follows:

1) New Audiovisual Education Materials
2) School broadcasting programs (NHK, Commercial Stations Educational Broadcasting Ass'n, etc.)
3) Locally-produced and Regional Study Materials
4) New Hardware
5) Prize-Winning Programs from Various Contests

c. Research Activities Callendar (Read/write)

This section is used for exchange of information and publicity for various conferences, study meetings, exhibits and other events sponsored by academic associations and organizations involved in audiovisual education.

d. Reading Materials "A la Carte" (Read/Write)

An outline of the contents of each issue of the monthly magazine "Audiovisual Education," and reviews of a variety of documents, materials, and reports, related to audiovisual education are included in this section. Users may also enter their own reviews and reports on books and other materials.

e. Ministry of Education News (Read only)

This section presents information from the Ministry of Education, Science and Culture. It includes updates on recommended instructional materials, personnel transfers, outlines of various reports, statistics related to audiovisual education, etvc., in other words, information basic to the administrative aspects of education.

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f. Audiovisual World (Read only)

Information from the International Council on Educational Media (ICEM], descriptions of trends in audiovisual education in countries outside Japan, etc., are available in this section.

g. Addresses (Read only)

This section has the following address lists, kept as supplemental information to the main Audiovisual Education Materials Database.

1) Audiovisual Centers and Libraries
2) Audiovisual Matrerials Producers
3) Audiovisual Equipment Manufacturers

III. COMMERCIAL COMPUTER NETWORKS AND EDUCATION

In Japan as of the spring of 1988 there were 13 major, nation-wide computer networks established for broad, general public participation. These were being used by approximately 128,000 people, but as many of the users are possibly using more than one network, the actual total number of computer network users is thought to be somewhat smaller. Most of the larger networks have an education section. These are used primarily by teachers, boards of education and those doing research in universities and elsewhere. In addition, it is said that there may also be 2,000 or so local networks. Some of these are maintained by students involved in computer data exchanges with students from other schools, even to include schools in other countries. The following are examples of some of the larger and more representative systems.

1. PC-VAN

PC-VAN is one of the largest of the commercial personal computer communications services in Japan. It's bulletin board has a section on ducation; one of the computer conferences in this section has been on "lifetime education." There are also special interest groups or SIGs for those with similar interests and concerns. Active among these are "Education and softweare" (STS), "Computer-Assisted Instruction Study Group" (CAI) and "Life and Education" (SMILE). Each SIG has a "Forum" for information exchange. The STS SIG now has 12 sub-groups, while the CAI and SMILE SIGs have sixc each. Each SIG also has a "Library" for retaining more permanent information, and the SIS SIG even has a section

for the exchange of participant-developed public domain software. Figure 13 shows the sub-group menus for each of these SIGs.

Figure 13.
PC-VAN "Forum" Menu for Three Selected SIGs

STS (Education and Software)

1. Lounge	2. Practical Applications Room
3. Study Room	4. Library Room
5. Students' Room	6. Faculty Room
7. Planning Room	8. Developmental Room
9. Evaluation Room	10. Consultation Room
11. Conference Room	12. Broadcasting Room

CAI (CAI Research Association)

1. CAI Bulletin Board	2. Activities/Events Guide
3. CAI Requests	4. Examples of CAI Applications
5. Intro. to CAI Books	6. Intro. to CAI Software

SMILE (Computers in Life and Education)

1. Life and Education	2. My Software Evaluations
3. Reports Room	4. National/Local Conf. News
5. Discussion Room	6. Question Box—Problems & Answers

Figure 14.
"Mainichi Newspaper Educational Forum" Menu

< Mainichi Newspaper Educational Forum > EMAI

1. Notices 2. Bulletin Board 3. Computer Conf.
4. Data Library 5. Info for Members 6. Real-Time Conf.
7. Letters to SYSOP E. Exit

>4

No.	Total	Entered	Newest Date	Library Title
1	51	(51)	08/22	General Information
2	9	(9)	08/22	Elementary Schools
3	5	(5)	08/22	Junior High Schools
4	9	(9)	08/19	Senior High Schools
5	12	(12)	08/19	Universities/Colleges
6	2	(2)	08/19	Junior Colleges
7	2	(2)	08/25	Technical & Misc. Schools
8	2	(2)	08/25	Schools for the Handicapped
9	2	(2)	08/25	Higher Technical Schools

2. NIFTY-Serve

NIFTY-Serve is another large telecommunications network with an educational/family section as part of its bulletin board. A variation on computer conferencing, its "forums" include such titles as "CAI Forum," " 'Temple Schools' of the Future," "Foreign Languages Forum," and the "Mainichi Newspaper Educational Forum." Unique to this network is the availability of a toll newspaper article search service. NIFTY-Serve also permits access to databases in the United States, to include those specializing in education. The "Mainichi Newspaper Educational Forum" not only permits free exchange of information on a variety of problems found in modern education but also provides up-to-date information on various aspects of education as gathered by the newspaper's reporters. The menu for the "Mainichi Newspaper Educational Forum" is shown in Figure 14.

3. Educational Sections Maintained by Other Networks

A number of other commercial networks also have educational sections. Organized by a publishing company, "Nikkei MIX" was developed primarily as a computer conferencing system. A number of its conferences have been related to the field of education. "TWICS-BeeLine" is a commercial English language service which utilizes an computer conference system and presently has an ongoing computer conference dubbed "Educational Talk." It is unique in that many of its participants are foreigners living in Japan. Since this system can also access American networks, its educational computer conferences are sometimes international in scope. Finally, all of the maritime high schools in Japan are connected through "SUIKO-VAN," a closed users group (CUG) established as part of a commercial network. This is being used for exchange of information, to include mutual sharing of teacher-developed software.

IV. LOCAL GOVERNMENTS NETWORKS AND EDUCATION

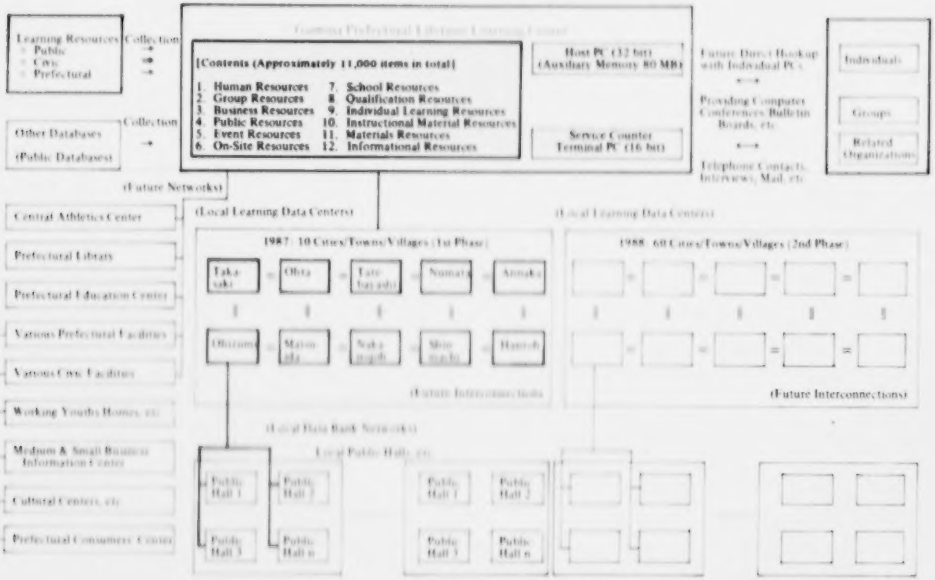
Local boards of education and similar organizations have also already established a number of computer networks. It is anticipated that in the future there will be a great increase in the number of systems of this type in Japan.

1. Prefectural Learning Information Networks

Prefectural Learning Information Networks designed to support lifetime educational activities were established in 1987 in Gumma and Hyogo Prefectures. These were made possible thanks to assistance received from the Ministry of Education, Science and Culture's funds for "Developing Learning Data Systems." These projects are designed to promote lifetime educational opportunities at the prefectural level as well as to provide individual assistance through the offering of advice and, via computers, the furnishing of information on study opportunities to local residents. Two more prefectures are selected to receive funds under this program in 1988.

Figure 15 is an outline of the system established by Gumma Prefecture. Located in the Prefectural Lifetime Learning Center, the host computer already has over 10,000 items on guidance personnel, study groups and organizations, use of study facilities, learning activities, exhibits and events, and other learning resources. Regional adult learning centers have been established in various cities, towns and villages within the prefecture and are connected to the host computer by telephone circuits. The JUST-PC system is used for all telecommunications. In addition to increasing the number of regional centers available, plans are also being made for ex-

Figure 15.
Gumma Prefecture's Learning Information Network



panding the network to include other related institutions and interested individuals.

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The basic concepts behind the organization of the Hyogo Prefecture Learning Information Network are similar to those for Gumma Prefecture. The host computer is located in the Prefectural Lifetime Education Center and connected by telephone circuits to computer terminals located in public halls and other facilities in various cities, towns and villages. Supported by a variety of on-line data sources, these facilities are able to easily respond to public requests for advice on educational opportunities. Based upon a preparatory prefecture-wide study titled "Survey on Desirable Learning Information," the data initially entered into this database is mostly information on guidance personnel, facilities, study groups, study projects and other topics for which the survey showed there were high levels of demand. Future plans include increasing the amount of information on file and expanding and upgrading system capabilities, to include the providing of an electronic mail service.

A survey by the Ministry of Education, Science and Culture has made it clear that many other prefectures have also developed specific plans for establishing computer systems which will be able to satisfy the people's desires for lifetime education.

2. Local Educational Information Networks

There are already a number of local networks which are bing maintained by various municipalities, eithr independently or jointly. In the Sapporo metropolitan region,Hokkaido Prefecture, for example, there is a network called "ANT" (Active Network of Teachers) designed for those involved in education. While in Sendai City, Miyagi Prefecture, the municipal "Sendai Kominetto" (Communication Net) has a section sponsored by a teachers' research association. In Tsuchiura City, Ibaraki Prefecture, an "Inter-school Experimental Network" has been opened, and in the region around Asahi City, Chiba Prefecture, there is an "Asahi Municipal Region Educational Data System" in operation. All of these provide on-line

statistical data for use as school instructional materials as well as information on photographs, pictures and films. The network serving the area surrounding Fukui City, Fukui Prefecture, has its host computer located in the Fukui Municipal Audiovisual Center. COARA, a system for Oita City, Oita Prefecture, and nearby communities is one of the most active of any such networks in Japan; Conferences on raising infants and education being among its many activities.

3. The University of the Air's "Computer Communications Club"

The University of the Air began to accept students in 1985. As a fully recognized institution of higher learning, it conducts distant education through a combination of TV and radio programs, printed texts and direct, face-to-face instruction. During 1987 and 1988, the National Institute of Multimedia Education established a "Computer communications Club" for University of the Air students. This was done in an attempt to clarify the possibilities of applying computer communications to distant education. Approximately 70 students paticipated in this computer conferencing system experiment. This system provided unlimited information exchange as well as offered supplementary English language instruction. Results showed that this system made it possible to greatly reduce some of the problems common to distant education, to include reducing feelings of a lack of a sense of belonging or of not having a sufficient amount of interaction with teachers and other students.

V. ACADEMIC NETWORKS

The Academic Information Center System, located in the National Center for Science Information in Tokyo, provides on-line databases for handling a variety of documents for universities and research institutuions throughout Japan. In 1988 it was operating a tottal of 19 databases. Representative among these were its "Life Science Collection, "COMPENDEX," "SciSearch," "Social SciSearch," "JPMARC," "LCMARC (Books)," and "LCMARC (Serials)." The Academic Information Center System also provides a national electronic mail service for universities and research institutions throughout Japan.

From all of the above, it is certain that in Japan the number of specialized databases set up by public interest organizations or newspaper publishers and other companies, as well as the number of users now having direct access to data bases and computer networks overseas will continue to grow rapidly.